Philippe Clément[1], Stig-Olof Londen[2] and Gieri Simonett[3] : *Quasilinear evolution equations and contiouous interpolation spaces*; Helsinki University of Technology Institute of Mathematics Research Reports A445 (2002).

Abstract: *In this paper we analyze the abstract parabolic evolutionary equations*

$$D_t^\alpha(u-x)+A(u)u=f(u)+h(t),\quad u(0)=x,$$

in continuous interpolation spaces allowing a singularity as $t\searrow 0$. *Here* D_t^α *denotes the time-derivative of order* $\alpha\in(0,2)$.
We first give a treatment of fractional derivatives in the spaces $L^p((0,T);X)$ *and then consider these derivatives in spaces of continuous functions having (at most) a prescribed singularity as* $t\searrow 0$. *The corresponding trace spaces are characterized and the dependence on* α *is demonstrated. Via maximal regularity results on the linear equation*

$$D_t^\alpha(u-x)+Au=f,\quad u(0)=x,$$

we arrive at results on existence, uniqueness and continuation on the quasilinear equation. Finally, an example is presented.

AMS subject classifications: 35K90, 35C90

Keywords: Abstract Parabolic Equations, Continuous Interpolation Spaces, Quasilinear Evolutionary Equations, Maximal Regularity

The first author acknowledges the support of the Magnus Ehrnrooth foundation (Finland). The second author acknowledges the support of the Nederlandse organisatie voor wetenschappelijk onderzoek (NWO).

ISBN 951-22-5921-4
ISSN 0784-3143
Espoo, 2002

Helsinki University of Technology
Department of Engineering Physics and Mathematics
Institute of Mathematics
P.O. Box 1100, 02015 HUT, Finland
email:math@hut.fi http://www.math.hut.fi/

[1]Department of Mathematics and Informatics
TU Delft
2600 GA Delft, The Netherlands
[2]Helsinki University of Technology
Stig-Olof.Londen@hut.fi
[3]Department of Mathematics
Vanderbilt University
Nashville TN 37240, USA